National Institute of Environmental Health Sciences

Modeling the relationship between precipitation and malaria incidence in children from a holoendemic area in Ghana

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Abstract:

Climatic factors influence the incidence of vector-borne diseases such as malaria. They modify the abundance of mosquito populations, the length of the extrinsic parasite cycle in the mosquito, the malarial dynamics, and the emergence of epidemics in areas of low endemicity. The objective of this study was to investigate temporal associations between weekly malaria incidence in 1,993 children < 15 years of age and weekly rainfall. A time series analysis was conducted by using cross-correlation function and autoregressive modeling. The regression model showed that the level of rainfall predicted the malaria incidence after a time lag of 9 weeks (mean Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 60 days) and after a time lag between one and two weeks. The analyses provide evidence that high-resolution precipitation data can directly predict malaria incidence in a highly endemic area. Such models might enable the development of early warning systems and support intervention measures.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3029183

Resource Description

Early Warning System: ☑

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☑

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Precipitation

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Country

Other African Country: Ghana

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content